the prevalence of cancer, he considers its position unique. He estimates that in 1840 there were 4500 persons suffering from cancer in England and Wales, whereas now there are about 40,000. No other disease can show anything like such an immense increase.

The influence of trauma and of pre-existing inflammatory lesions he minimizes, contrary to the widespread belief both in the profession and among the laity, and concludes his careful review of this part of the subject as follows: "The outcome of all this is that intrinsic causes are much more important factors in the origination of cancer than extrinsic ones, which are by no means its necessary antecedents. In the vast majority of cases the outbreak of this disease appears to be entirely spontaneous; that is to say, it cannot be attributed to the immediate action of any appreciable extrinsic cause whatever. The occasional transformation of innocent into malignant growths must be admitted, but he thinks this very different from admitting that such neoplasms are specially prone to develop malignantd isease. This is disproved by the extreme rarity of the coincidence. My investigations show that non-malignant mammary neoplasms are less liable to originate cancer than are the glandular elements of the breast itself."

Transition from one species of malignant new formation to another has never been verified.

His mode of operation involves the complete extirpation of the breast with its various prolongations—too commonly neglected—the removal of part, or the whole, of the sternal portion of the pectoralis major and the thorough cleaning out of the axillary fat and glands. This is now the practice of the majority of surgeons everywhere, yet while so excellent an authority as Sutton says "The axilla should not be opened unless there is good reason to believe that its lymph-glands are infected," it seems proper to emphasize the above teaching which certainly has behind it the weight of modern authority.

The latter chapters of the book are no less complete and instructive, and deal fully with the less common forms of malignant diseases and with the inflammatory and suppurative lesions of the breast.

The monograph is one deserving the highest commendation even from those who do not accept the author's pathological views, as it is written in the true scientific spirit and bears witness on every page to wide reading, industrious and painstaking compilation, and original thinking. It is a most valuable addition to the literature of the subject. J. W. W.

DIE CAUSALE BEHANDLUNG DER TUBERCULOSE. EXPERIMENTALLE UND KLINISCHE STUDIEN. By VON EDWIN KLEBS.

THE TREATMENT OF TUBERCULOSIS. By EDWIN KLEBS.

THIS treatise of Klebs makes a book of 630 pages, and contains much of interest on the pathological anatomy of the disease. It is divided into two parts, and in each part there are several chapters. The object of the book is to show the favorable result of the treatment of tuberculosis by a substance which he has obtained from Koch's tuberculin. The substance derived from tuberculin he first called tuberculocidin, but by using a purer form of tuberculin, which he obtained by growing the tubercle bacilli on liquid media, he produced a tuberculocidin of greater purity and efficacy, which he calls antiphthisin. The antiphthisin is patented. The theories of the general pathology of disease which he derived from its anatomical study are in accord with the supposed mode of action of antiphthisin and its curative effect.

In the introduction he says the idea that tuberculosis represents a disease from which recovery is possible conforms with the facts shown by its anatomical study. Nothing is more common at autopsies than various evidences of spontaneous recovery from tuberculosis. In various parts of the body conditions are found which admit of no other interpretation than that the disease has existed here and has been recovered from. His attention was early called to the varying results which were reported of the treatment with tuberculin. In some of the reports it seemed to exercise a definite control over the disease. In other cases there was no such control. It seemed probable to him that these variations might depend upon the composition of the tuberculin. Tuberculin should not be considered as a definite chemical substance, but as a mixture of various substances, some of which might exert a favorable action, while other substances contained in it either had no action or an injurious one. He made the attempt to separate from the tuberculin those substances which exert a favorable action on the disease from the others. Koch's theory that the favorable action of the tuberculin consisted in production of extensive necrosis, with a walling up of the tubercle bacilli in the necrotic material, did not seem to him to correspond with the facts. He also thought that the second idea of Koch's, that the tubercle bacilli themselves were not influenced by the tuberculin, was not certain. Most of the theories of the action of the tuberculin come from observations made on lupus, and are not applicable to all forms of tuberculosis.

In the first chapter there is a very good historical review of tuberculosis. He speaks of his own early work on the disease and the various facts derived from its anatomical study which led him to believe in its infectiousness. He was early led to the belief that the alimentary canal was frequently the source from which infection takes place. He repeated the inoculation-experiments of Villemin, using the peritoneal cavity for the seat of inoculation, and was able to follow the course of the disease from this to other organs.

While in Berne he was struck with the frequency of miliary tuberculosis in the cattle-herders on the Berne overlands. These people live during the entire summer on the Alps, and their food consists entirely of milk and bread. The food seemed to be the only possible source of infection, and he was able to trace it to the milk. He had already shown the identity of the pearly disease of cattle with tuberculosis, and found it common in these herds. Anatomical investigation of these cases of miliary tuberculosis almost always showed the absence of old tuberculosis foci such as were described by Buhl, and he was led to regard the disease as one conveyed directly from the cattle to man by the use of infected milk.

In his earlier work on tuberculosis he thought he had discovered the specific organisms of the disease in small, round, or oval organisms which he found in the process.

In the second chapter, relating to the source of disease, he takes up the various views as to the manner of infection. In the earlier views the lungs were regarded as the essential seat of the process and as the primary focus of infection. A more thorough investigation, based on a greater knowledge of the anatomical features of the disease, shows that this is by no means the case. After it was found that all of the pathological processes designated as scrofula undoubtedly belong to tuberculosis, there seems no doubt that the digestive tract is by far the most common portal of infection. The tubercle bacilli can enter into the tissues from the digestive tract without producing any local lesions at the point of entry, and from this they are generally conveyed to the nearest lymphatic glands and produce the disease in these. In certain cases, especially in adults, the tubercle bacilli can enter from the alimentary canal into the blood and produce a general miliary tuberculosis without any affection of the lymph-glands. The evidence of this is given in the cases which he saw in Berne, where miliary tuberculosis was produced from the using of milk of tuberculous cattle in perfectly healthy strong adults. He produced acute miliary tuberculosis in a dog by feeding it on the milk of a tuberculous cow. The course of the disease is influenced by the source of infection, the virulence of the organisms, and the resistance of the tissue. Even in the lungs the lesions of the disease differ, when the source of infection is the alimentary canal, from the inhalation-tuberculosis, in which the first evidence of the disease is seen in tuberculosis, bronchitis, and peribronchitis.

In infection by the blood the tubercle bacilli enter into the vessels of the infundibula of the lungs and find here the most suitable conditions for their growth. Pulmonary hemorrhage favors the extension of tuberculosis, in that the hemorrhagic areas offer suitable places for the development of the organism. He thinks that actual heredity of tuberculosis, which he also speaks of as an intrauterine affection, is not to be denied, but takes place very rarely. It is possible that this intrauterine infection can take place either from the mother or from the father.

Immunity in tuberculosis may depend upon a number of conditions, among which the vascularity of the organ into which the tubercle bacilli first enter is of primary importance.

In the third chapter he gives the action of tuberculin on infected guinea-pigs. He shows in various ways that tuberculin may have a direct destructive action on the tubercle bacilli, and also may produce a condition of immunity. The spontaneous healing of the tubercle, as far as can be told from observations made on man, is due to three different processes: Necrosis and exfoliation of deceased tissue, as are seen in lupus, cicatricial formation,' and simple retrograde metamorphosis of the tuberculous tissue after the tubercle bacilli have been destroyed. Tuberculous tissue is analogous to that produced around parasites of all sorts, and offers a certain degree of protection against the destructive influence of the bacilli. This protection of the tuberculous tissue loses its power of action as soon as the cells degenerate; that is, as soon as they lose their physiological activity or break down. The persistency of the living tuberculous tissue secures the organism from further danger.

A condition of latent disease lasting for a long time may be brought about. The latency of the disease ceases when the tubercle bacilli have so increased that they extend beyond the limits of the tuberculous tissue. This last condition is especially apt to appear when the cells of the tubercle undergo a diminution in their vital resistance.

In his studies on the healing tubercle he was able to show the presence, by various means of staining, of certain chemical substances, coming from the cells, which he thinks could be of importance in the process. Among these probably the most important is the globulin which is derived from the red corpuscles. The favorable action of the tuberculin is due to an exudation produced around the tubercles under the influence of which the cells lose their rigidity and no longer protect the bacilli. They become transformed into normal cells, and offer no opposition to the entry of the fluid exudation into the tubercle, and this exudation can then exert its destructive influence on the tubercle bacilli. The local leucocytosis which accompanies the inflammatory exudation brings to the tissues nuclein, which has an action both on the bacilli and the cells.

Klebs regards as the most important constituent of tuberculin a substance which he calls tuberculocidin, which is obtained from the tuberculin of Koch by precipitation with alcohol and further purification of the precipitate.

In the second part he takes up the results of treatment of tuberculosis with tuberculocidin. In his study of the action of the tuberculocidin he divides the tuberculous process into four stages. In the first, which usually corresponds to the period of latency of the disease, the changes in the organs are so slight that they may escape a superficial examination. In animals this stage corresponds to between the second and third week after inoculation. In the second stage there is a further extension of tuberculous disease to a number of organs and an extension within the individual organs. In the lungs at this period an infiltration can be made out with certainty. In the place of the small disseminated foci there are large areas of infiltration shown by dulness on percussion. Tubercle bacilli appear in the secretion and give a certain diagnostic sign, but they are in small numbers. The third stage is characterized by the beginning of destruction in the diseased areas; cavity-formation in the lungs and superficial ulceration may also appear. As long as these are in slight degree it is possible for recovery to take place. This third stage may be regarded as the beginning of a phthisis. In the fourth stage there is a well-marked phthisis, with an extensive destruction of organs.

In all of these stages of the disease the tuberculocidin exerted a beneficial influence. This was more marked in the earlier than in the later stages.

In Klebs's first methods of producing the tuberculocidin he used Koch's tuberculin. He succeeded afterward by other methods of producing a tuberculin of a better character than that produced in the method of Koch, and from this tuberculin he has obtained a tuberculocidin which he designates as antiphthisin, which substance is patented. This antiphthisin has a much stronger action than the tuberculocidin, and has none of the unpleasant features observed in tuberculin and in the more impure tuberculocidin.

At the conclusion of the work he gives a number of letters from physicians as to the results obtained by the use of antiphthisin.

W. T. C.